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BEFORE THE  
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WASHINGTON, D.C. 20554

JUN 15 1994

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the Matter of )

Allocation of Spectrum Below )  
5 GHz Transferred from )  
Federal Government Use )

ET Docket No. 94-32

To the Federal Communications Commission:

COMMENTS OF  
SOUTHWESTERN BELL CORPORATION

James D. Ellis  
Mary W. Marks  
175 E. Houston, 12th Floor  
San Antonio, Texas 78205  
(210) 351-3478

ATTORNEYS FOR  
SOUTHWESTERN BELL CORPORATION

June 15, 1994

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## SUMMARY

Southwestern Bell Corporation ("SBC") submits these Comments in response to the Commission's NOI seeking information on potential applications for 50 MHz of spectrum that is to be transferred immediately from the Federal Government to the private sector. The Commission seeks by the reallocation to provide for the introduction of new services and the enhancement of existing services.

SBC suggests that the Commission's goals would be furthered by allocating one of the three bands identified for immediate reallocation, the 2390-2400 MHz band, for exclusive use by local exchange carriers in providing wireless local loop service to their customers. SBC further recommends that the Commission delay the licensing of that band until it can be paired with the 2300-2310 MHz band. This pairing would permit more efficient use of both bands.

The use of wireless local loop technology will benefit all telephone customers by reducing the cost of the telephone infrastructure while providing the capability to offer new services. Wireless local loop technology can reduce installation and maintenance costs, provide bandwidth on demand, and reduce the cost of providing additional telephone access lines to a customer. Wireless local loop technology allows rehabilitation of aging plant to be accelerated because of lower costs and quicker deployment. Local exchange carriers can thus particularly improve service to customers in areas where the telephone plant is older and service

quality may be beginning to deteriorate, and rehabilitation is difficult and costly.

Because of the high power and intermittent nature of the existing amateur operations in the 2390-2400 MHz band, sharing of spectrum by a wireless local loop system and the amateur operators is not feasible, particularly in high population density areas. SBC thus urges that the 2390-2400 MHz band, along with the 2300-2310 MHz band, be restricted to exclusive use for the wireless local loop application. This restriction is necessary because the coverage area will be expanding, and the quality of wireless local loop service must be at least as good as that of the current wired telephone network.

For reasons stated herein, SBC does not in these Comments suggest an application for the other two spectrum bands available for immediate allocation, the 2402-2417 MHz band and the 4660-4685 MHz band.

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To the Commission:

COMMENTS OF  
SOUTHWESTERN BELL CORPORATION

Southwestern Bell Corporation ("SBC") respectfully submits these Comments in response to the Commission's Notice of Inquiry herein, which was released May 4, 1994. In that NOI, the Commission sought information on potential applications for 50 megahertz of spectrum that is to be transferred immediately from the Federal Government to the private sector as required by the Omnibus Budget Reconciliation Act of 1993. The spectrum identified for immediate reallocation is the 50 megahertz at the bands 2390-2400 MHz, 2402-2417 MHz, and 4660-4685 MHz. The Commission's stated goal in the reallocation of that spectrum is to provide for the introduction of new services and the enhancement of existing services.

SBC suggests that the Commission's goals would be furthered by allocating the 2390-2400 MHz band for use by local exchange carriers in providing wireless local loop service for their customers. SBC further recommends that the Commission delay the licensing of that band until it can be paired with the 2300-

2310 MHz band.<sup>1</sup> This pairing would permit more efficient use of both bands. For reasons stated below, SBC does not in these Comments suggest an application for two of the bands, the 2402-2417 MHz and the 4660-4685 bands.

I. USE OF THE 2390-2400 MHz BAND FOR WIRELESS LOCAL LOOP SERVICE WOULD BE AN APPROPRIATE USE OF THE SPECTRUM AND WOULD RESULT IN NETWORK EFFICIENCIES.

For some time, Southwestern Bell Telephone Company ("SWBT"), the local exchange carrier that is a subsidiary of SBC, has been investigating the use of wireless technology in the local loop for residential and small business telephone service.<sup>2</sup> The technology has evolved so that wireless local loop service is competitive both in price and in level of service when compared to copper wire and fiber digital local loop technology. Before effective deployment of the technology can occur, spectrum must be allocated specifically for use with this technology.

The wireless local loop would replace the drop wire to the home or small business, as well as a portion of the telephone distribution plant, with a low power microcellular radio system. The system would consist of radio transceivers (radio ports), mounted on such structures as telephone poles, utility poles, and street lights, throughout a residential neighborhood to provide

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<sup>1</sup>The 2300-2310 MHz band is currently scheduled to be made available to the private sector in January 1996. Advancing that date, however, could accelerate the deployment of wireless local loop service.

<sup>2</sup>SWBT is currently conducting a trial of wireless local loop technology in St. Louis County, Missouri. See File # 3037-EX-PL-92 (Quarterly Progress Reports of Southwestern Bell Technology Resources, Inc.).

connectivity to transceivers mounted on the customers' homes. The radio ports would be mounted at a height of fifteen to twenty feet, and the fixed subscriber units on customers' homes would be mounted at a height of approximately six feet. The use of wireless technology allows the concentration of customer traffic "in the air," resulting in more efficient use of the telephone feeder and distribution network through the use of shared resources. In addition, since this technology is digital, it is fully encrypted to allow private and secure communications.

Each radio port will serve an area covered by a circle with an approximate radius of 1,000 feet. Using a system based on the Bellcore Wireless Access Communications System<sup>3</sup> technology, 35 to 40 homes can be served by each radio port. The low antenna heights and low power, with attendant frequency reuse, lead to very high capacity and spectral use efficiency. The use of bandwidth on demand and digital transmission also allows flexible use of the facilities and capabilities of the system, as well as innovative applications arising from wireless access to the public switched telephone network ("PSTN"), such as remote meter reading and rapid recovery systems for natural disasters. In addition, if the radio ports are mounted higher, longer ranges result, thus permitting a single radio port to efficiently serve customers in less densely populated environments.

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<sup>3</sup>"Generic Criteria for Version 0.1 Wireless Access Communications Systems (WACS)," Bellcore Technical Reference, TR-INS-001313, Issue 1, October 1993, and "Generic Criteria for Version 0.1 Wireless Access Communications Systems ("WACS")," Bellcore Technical Reference TR-INS-001313, Supplement 1, June 1994.

The use of wireless local loop technology will also permit easier and cheaper rehabilitation of aging copper plant, with less service disruption and inconvenience to customers; digging through established yards and streets would no longer be necessary in order to place new facilities. As a result, deployment of wireless local loop technology will allow local exchange service providers to accelerate the rehabilitation of aging plant. Local exchange carriers can thus particularly improve service to customers in areas where the telephone plant is older and service quality is beginning to deteriorate, and where rehabilitation is difficult and costly.

In summary, the use of wireless local loop technology will benefit all telephone customers by reducing the cost of the telephone infrastructure while providing the capability to offer new services. Wireless local loop technology can reduce installation and maintenance costs, provide bandwidth on demand, and reduce the cost of providing additional telephone access lines to a customer.

II. ALLOCATING THE 2390-2400 Mhz BAND TO WIRELESS LOOP SERVICE WILL BENEFIT CUSTOMERS BY FACILITATING DEPLOYMENT OF THAT TECHNOLOGY.

SBC's analyses have shown that wireless local loop technology provides significant economic benefits with as little as 20 MHz of spectrum. Because of economics and frequency propagation characteristics, such spectrum should be below 3 GHz. One of the bands being considered in this docket, the 4660-4685 MHz band, is obviously above 3 GHz. Equipment in that band would be more costly because more equipment is produced for lower band frequencies and



because higher cost circuitry is required for the higher band frequencies. In addition, most of the radio links for the wireless local loop application will not be line-of-sight. Use of frequencies in the 4.6 GHz band would present difficult coverage and service problems.

The other two bands considered in this docket, the 2390-2400 MHz band and the 2402-2417 MHz band, have appropriate propagation and other characteristics for use with wireless local loop technology. The existing use, however, of the 2402-2417 band for industrial, scientific, and medical ("ISM") applications make use of that band for wireless local loops inadvisable. The most prevalent use of this band is for microwave ovens. Use of the microwave ovens would likely cause unacceptable interference with residential wireless local loop service. In addition, the wireless local loop system could cause unacceptable interference with other ISM applications operating in this band.

The 2390-2400 MHz band is appropriate for use in connection with wireless local loop technology. It is, however, unpaired, thus necessitating the use of Time Division Duplex ("TDD") technology. The TDD technology presents a number of disadvantages in the outdoor local exchange environment, including greater sensitivity to delay spread, inefficient use of radio spectrum resources, and wide area synchronization requirements. SBC thus recommends that the 2390-2400 MHz frequency band be allocated exclusively for wireless local loop technology but that licensing of this spectrum be delayed until it can be paired with the 2300-2310 MHz band. At that time, the Commission should

allocate the 2300-2310 MHz and the 2390-2400 MHz as paired frequencies exclusively for the use of wireless local loop technology and should license the frequencies together. The allocation of paired frequencies would enable the use of Frequency Division Duplex ("FDD") technology for that application. In addition, the proximity of these bands to the emerging technologies frequency band, along with the fact that emerging technologies commonly use the FDD technology, would keep the cost of equipment lower.

Deployment of wireless local loop technology is not facilitated by existing spectrum allocations. Although the Commission, in its June 9 Open Meeting, indicated that it plans to relax the build-out requirements for both the 10 MHz and the 30 MHz Personal Communications Service ("PCS")<sup>4</sup> licenses, use of either of these licenses for wireless loop service remains unattractive.

The revised build-out requirements for the 30 MHz licenses, although reduced, remain too stringent to allow SBC to consider using this spectrum solely for wireless local loop service. SWBT's primary use of wireless local loops would be for new growth in access lines and for rehabilitation of aging plant. Together, these uses would produce roughly three percent coverage of a particular service area per year. Since the revised build-out requirements for the 30 MHz licenses exceed this anticipated deployment (for new growth and rehabilitation), use of the 30 MHz licenses would not be feasible just for wireless local loop

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<sup>4</sup>GEN Docket No. 90-314, In the Matter of Amendment of the Commission's Rules to Establish New Personal Communications Services, Second Report and Order, September 23, 1993.

service. And, while SWBT could possibly meet the reduced build-out requirements associated with the 10 MHz licenses, SWBT would prefer to use spectrum in one single band (the 2.3 GHz band) as opposed to possibly being required to use spectrum in two separate bands (the 1.8/1.9 GHz PCS spectrum and the 2.3 GHz spectrum) for wireless local loop service. Using spectrum in a single band would be more efficient and would eliminate the necessity of SWBT's developing two separate wireless local loop systems to support two different spectrum bands. For these reasons, SBC urges the Commission to dedicate a portion of the 2.3 GHz spectrum to wireless local loop service, with the relaxed build-out requirements discussed in SBC's previously filed Petition for Reconsideration, since the deployment of the service.

### III. SPECIFIC RESPONSES TO THE COMMISSION'S INQUIRIES<sup>5</sup>

#### **a) Economic growth and competition:**

Provision of telephone service utilizing wireless technology will promote economic growth of the radio industry and reduce the cost of providing local service. Wireless technology will also enable the local exchange carrier to accelerate rehabilitation of aging telephone plant and to enhance the implementation of the national information infrastructure.

Wireless access to the PSTN will also lead to the development of new services such as digital data transmission, bandwidth on demand, remote meter reading, and wireless payphones. Wireless access can make telephone service available to small

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<sup>5</sup>ET Docket No. 94-32, Notice of Inquiry released May 4, 1994, paragraph 9, pages 6-8.

businesses that could not obtain service in the past. For example, some small businesses currently operate out of kiosks in shopping malls. Since the kiosks are not permanently located, and since the mall management often is unwilling for new telephone facilities to be installed, many of these small businesses have not had telephone service. With the implementation of the wireless local loop service, a radio port could be placed within the mall in order to provide telephone service to these small businesses without significant expense to the management of the mall. The new service mentioned above will spur economic growth for the providers of the kiosk services and for providers of the hardware and software necessary for the wireless drop services. Wireless local loop technology will help keep the United States in a position of technical leadership in the rapidly growing communications arena.

The hardware required to provide the wireless local loop (based on the Bellcore WACS definition) is currently under development by several manufacturers; it will conform to the "low tier" PCS air interface standard being defined by the Joint Technical Committee on a common air interface for PCS. Adoption of a common standard will improve the economies of scale, interoperability, and the introduction of new services.

**b) Restrictions on the band:**

The 2390-2400 MHz band should not be used for airborne or space-to-earth communications; its use should also be restricted in the vicinity of the Puerto Rico planetary research radar facility unless the provider could show that a proposed application would cause no harmful interference. The use of this band should also be

conditioned on proper filtering of out-of-band emissions such that adjacent channel services, and services in harmonically-related bands, are not adversely impacted.

SBC also proposes that the 2390-2400 MHz band, along with the 2300-2310 MHz band, be restricted to exclusive use for the wireless local loop application. This restriction is necessary because the coverage area of the wireless local loop will be expanding, and the quality of such service must be at least as good as that of the current wired telephone network.

**c) Disruption of government users by amateur service:**

SBC has no comment on this issue.

**d) Sharing spectrum with existing services:**

Because of the high power and intermittent nature of amateur operations in the 2390-2400 MHz band, sharing of spectrum by a wireless local loop system and the amateur operators is not feasible, particularly in high population density areas. The amount of power transmitted by an amateur station would cause unacceptable interference to the wireless local loop system; if a wireless local loop base station is within the main beam of the amateur station receive antenna, the wireless local loop system could cause interference to the amateur operator. The intermittent nature of the amateur operations would make their use difficult to detect if an effort were to be made to avoid their frequencies. The cost and complexity that would be involved to enable the sharing would be substantial.

**e) Use of the 2402-2417 MHz band and ISM:**

As stated above, the use of the 2402-2417 MHz spectrum band for wireless local loop application would be inadvisable because it is unpaired and it is in the ISM band. The prevalent use of microwave ovens, with the accompanying high likelihood of interference, would make this frequency band less than optimal for a residential service application. In addition, the wireless local loop system could cause unacceptable interference to other ISM equipment in this band.

**f) Public safety communications:**

The use of the 2390-2400 MHz band, paired with the 2300-2310 MHz band, for wireless local loop application can improve public safety communications.

For device-to-device communications (e.g., walkie-talkies), this spectrum is not a good choice. The propagation characteristics of these frequencies make them inappropriate. However, wireless access to the PSTN through the wireless local loop infrastructure, through portable handsets using the wireless local loop technology and protocol, could greatly enhance public safety communications. This technology can support mobile handsets for such use, and the access to the PSTN enables communication with anyone on any network connected to the PSTN, not simply to other persons using the same radio frequency with the same protocols. In this way, public safety workers on cellular, private mobile networks, satellite mobile networks, and the PSTN can all communicate and coordinate their actions.

The wireless local loop system would also be highly resilient in situations of natural disaster, and repair or recovery time would be much faster. The application would also simplify the establishment of temporary, high capacity access to the PSTN for public safety workers, while still allowing those workers to be mobile.

g) **Application of these bands to biomedical telemetry:**

SBC has no comment on this issue.

h) **Licensing delay:**

Since the spectrum blocks that have been identified for immediate allocation are unpaired, technology choices are limited to TDD systems. Such systems are not optimal for outdoor use. The combination of the 2390-2400 MHz band with the 2300-2310 MHz band, which is currently scheduled to be available in January 1996, would be a natural pairing and would overcome the technology limitation. SBC urges the Commission to dedicate both bands to the wireless local loop application and to delay licensing until the 2300-2310 MHz band is available. These two bands should then be licensed as paired spectrum for the exclusive use of wireless local loop systems. That action would also provide a 20 MHz allocation for the technology, which will improve the cost effectiveness and flexibility of the wireless local loop system.

#### IV. CONCLUSION

SBC recommends that the Commission allocate the 2390-2400 MHz band for exclusive use by local exchange carriers in providing wireless local loop service for their customers. SBC further recommends that the Commission delay the licensing of the 2390-

2400 MHz band until it can be paired with the 2300-2310 MHz band when the 2300-2310 MHz also becomes available to the private sector. The use of wireless local loop technology will benefit all telephone customers by reducing the cost of the telephone infrastructure while providing the capability to offer new services. Wireless local loop technology can reduce installation and maintenance costs, provide bandwidth on demand, and reduce the cost of providing additional telephone access lines to a customer.

For reasons described above, SBC does not in these Comments suggest an application for two of the bands that are the subject of this docket, the 2402-2417 MHz and the 4660-4685 bands.

Respectfully submitted,

SOUTHWESTERN BELL CORPORATION

By: Mary W. Marks  
James D. Ellis  
Mary W. Marks  
175 E. Houston, 12th Floor  
San Antonio, Texas 78205  
(210) 351-3478

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SOUTHWESTERN BELL CORPORATION

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